ACID RAIN AND GEOTHERMAL DEVELOPMENT

Acid rain usually originates with emissions of SO_2 (sulfur dioxide) which can oxidize into SO_3 and eventually into H_2SO_4 (sulfuric acid) which can fall as acid rain. Three potential sources of acid rain will be discussed: 1) natural volcanic emissions, 2) geothermal emissions, and 3) emissions from oil-fired power plants.

1) Volcanic Emissions-

The latest DPED environmental baseline survey of Hawaii Island (Houck, 1984) concludes:

-Sulfur dioxide concentrations due to volcanic activity can exceed human health and plant impact values for days at a time. In the absence of volcanic impact, SO_2 values are low.

-Rain water in Puna and Kau districts is slightly acidic due to long range transport of pollutants across the Pacific and due to acidification from local volcanic sources of SO_2.

2) Geothermal Emissions-

There is no detectable amount of SO_2 emitted from the HGP-A noncondensable (gas) stream (see table 3.0-1 attached). However there are emissions of H_2S (hydrogen sulfide) which can oxidize to form SO_2 to SO_3 and eventually H_2SO_4. This chemical process would take days to occur. Hawaiian geothermal developments will likely have abatement systems which can abate H_2S emissions by about 99%. The recent DOH proposed air quality standards would require 98% H_2S abatement during plant operation [§11-60-23.1(c)] in addition to an incremental standard.

3) Oil-fired Plant Emissions-

Due to the sulfur content of fuel oil, oil-fired power plants may emit about 100 times more SO_2 per megawatt-hour than would a geothermal power plant (Thomas, 1984).

- In summary, rain in Puna and Kau is presently slightly acidic due to local volcanic emissions and emissions originating outside the state. The only potential source of acid rain from geothermal development would be H_2S. However with present technology H_2S can be abated by about 99%. The remaining 1% H_2S that is emitted would take days to become acidic; by that time the prevailing winds should take any pollutant out to sea. Replacement of oil-fired plant capacity with geothermal plants may actually reduce the potential for acid rain in the area. Thus, acid rain from geothermal sources should not significantly effect nearby land regions.